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=> s ethylene(2a)(vinyl (1w) (acetate or ester))

L1 84597 ETHYLENE(2A)(VINYL (1W) (ACETATE OR ESTER))

=> s l1 and copolymer? (3a)(vinyl (1w) (acetate or ester))

L2 65280 L1 AND COPOLYMER? (3A)(VINYL (1W) (ACETATE OR ESTER))

=> s L2 and (recover? or reuse or reusing)(1a)ethylene

L3 28 L2 AND (RECOVER? OR REUSE OR REUSING)(1A) ETHYLENE

=> d l3 1-28 ibib abs

L3 ANSWER 1 OF 28 USPATFULL on STN

ACCESSION NUMBER: 2003:81786 USPATFULL

TITLE: Gas phase polymerization of olefins

INVENTOR(S): Swindoll, Robert D., Richwood, TX, United States  
Story, Bruce A., Lake Jackson, TX, United States  
Kolthammer, Brian W. S., Lake Jackson, TX, United States

Peil, Kevin P., Auburn, MI, United States

Wilson, David R., Midland, MI, United States

Stevens, James C., Richmond, TX, United States

PATENT ASSIGNEE(S): BP Chemicals Limited, London, UNITED KINGDOM (non-U.S. corporation)

NUMBER	KIND	DATE
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US 6538080	B1	20030325
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PATENT INFORMATION:	US 6538080	B1	20030325
APPLICATION INFO.:	US 2000-498912		20000204 (9)

RELATED APPLN. INFO.:	Continuation of Ser. No. US 1996-659976, filed on 3 Jun 1996, now patented, Pat. No. US 6025448		
	Continuation-in-part of Ser. No. US 1994-308068, filed on 16 Sep 1994, now abandoned		
	Continuation-in-part of Ser. No. US 1993-122852, filed on 17 Sep 1993, now abandoned		
	Continuation-in-part of Ser. No. US 1995-475737, filed on 7 Jun 1995, now abandoned		
	Continuation-in-part of Ser. No. US 1995-378998, filed on 27 Jan 1995, now abandoned		
	Continuation-in-part of Ser. No. US 1993-54379, filed on 28 Apr 1993, now abandoned		
	Division of Ser. No. US 1991-776130, filed on 15 Oct 1991, now patented, Pat. No. US 5272236		
	Continuation-in-part of Ser. No. US 1995-510527, filed on 2 Aug 1995, now abandoned		
	Continuation of Ser. No. US 1993-10958, filed on 29 Jan 1993, now abandoned		
	Continuation-in-part of Ser. No. US 1994-208068, filed on 8 Mar 1994, now abandoned		
	Continuation of Ser. No. US 1991-815716, filed on 30 Dec 1991, now abandoned		
	Continuation-in-part of Ser. No. US 1995-433785, filed on 3 May 1995, now abandoned		
	Division of Ser. No. US 1994-208068, filed on 8 Mar 1994, now abandoned		
	Continuation-in-part of Ser. No. US 1990-545403, filed on 3 Jul 1990, now abandoned		
	Continuation-in-part of		

Ser. No. US 1996-626303, filed on 1 Apr 1996, now patented, Pat. No. US 5763547

DOCUMENT TYPE: Utility  
 FILE SEGMENT: GRANTED  
 PRIMARY EXAMINER: Wu, David W.  
 ASSISTANT EXAMINER: Choi, Ling-Siu  
 LEGAL REPRESENTATIVE: Finnegan, Henderson, Farabow, Garrett and Dunner, L.L.P.  
 NUMBER OF CLAIMS: 24  
 EXEMPLARY CLAIM: 1  
 NUMBER OF DRAWINGS: 1 Drawing Figure(s); 1 Drawing Page(s)  
 LINE COUNT: 2060

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A gas phase fluidized bed process is described for producing ethylene polymers having improved processability and an MWD of less than about 2.9. Multiple reactors in series or parallel may be used to produce in-situ blended polymers. Each reactor can separately have a constrained geometry catalyst or a conventional Ziegler-Natta catalyst as needed for obtaining in-situ blended polymer with the desired properties as long as there is a constrained geometry catalyst in at least one reactor. Olefin polymers can be produced according to this invention which have low susceptibility to melt fracture, even under high shear stress conditions.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 2 OF 28 USPATFULL on STN

ACCESSION NUMBER: 2000:18533 USPATFULL  
 TITLE: Gas phase polymerization of olefins  
 INVENTOR(S): Swindoll, Robert D., Richwood, TX, United States  
 Story, Bruce A., Lake Jackson, TX, United States  
 Kolthammer, Brian W. S., Lake Jackson, TX, United States  
 Peil, Kevin P., Auburn, MI, United States  
 Wilson, David R., Midland, MI, United States  
 Stevens, James C., Richmond, TX, United States  
 PATENT ASSIGNEE(S): The Dow Chemical Company, Midland, MI, United States (U.S. corporation)

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 6025448		20000215
APPLICATION INFO.:	US 1996-659976		19960603 (8)
RELATED APPLN. INFO.:	Continuation-in-part of Ser. No. US 1994-308068, filed on 16 Sep 1994, now abandoned Ser. No. Ser. No. US 1995-475737, filed on 7 Jun 1995, now patented, Pat. No. US 5703168 Ser. No. Ser. No. US 1995-510527, filed on 2 Aug 1995, now abandoned Ser. No. Ser. No. US 1994-208068, filed on 8 Mar 1994, now abandoned And Ser. No. US 1990-545403, filed on 3 Jul 1990 which is a continuation-in-part of Ser. No. US 1989-401345, filed on 31 Aug 1989, now abandoned Ser. No. Ser. No. US 1989-401344, filed on 31 Aug 1989, now abandoned Ser. No. Ser. No. US 1989-428082, filed on 27 Oct 1989, now abandoned Ser. No. Ser. No. US 1989-428283, filed on 27 Oct 1989, now abandoned Ser. No. Ser. No. US 1989-428276, filed on 27 Oct 1989, now abandoned And Ser. No. US 1990-520168, filed on 9 Apr 1990, now abandoned which is a continuation of Ser. No. US 1989-436524, filed on 14 Nov 1989, now abandoned And a continuation-in-part of Ser. No. US 1996-626303, filed on 1 Apr 1996, now patented, Pat. No. US 5763547, said Ser. No. US 1996-308068, filed on 1 Apr 1996, now patented, Pat. No. US 5763547 which is a		

continuation-in-part of Ser. No. US 1993-122852, filed on 17 Sep 1993, now abandoned , said Ser. No. US 475737 which is a continuation-in-part of Ser. No. US 1995-378998, filed on 27 Jan 1995, now abandoned which is a continuation-in-part of Ser. No. US 1993-54379, filed on 28 Apr 1993, now abandoned which is a division of Ser. No. US 1991-776130, filed on 15 Oct 1991, now patented, Pat. No. US 5272236 , said Ser. No. US 510527 which is a continuation of Ser. No. US 1993-10958, filed on 29 Jan 1993, now abandoned , said Ser. No. US 208068 which is a continuation of Ser. No. US 1991-815716, filed on 30 Dec 1991, now abandoned which is a continuation-in-part of Ser. No. US 1995-433785, filed on 3 May 1995, now abandoned which is a division of Ser. No. US 208068

DOCUMENT TYPE: Utility  
 FILE SEGMENT: Granted  
 PRIMARY EXAMINER: Wu, David W.  
 ASSISTANT EXAMINER: Choi, Ling-Siu  
 NUMBER OF CLAIMS: 52  
 EXEMPLARY CLAIM: 1  
 NUMBER OF DRAWINGS: 1 Drawing Figure(s); 1 Drawing Page(s)  
 LINE COUNT: 2294

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A gas phase fluidized bed process is described for producing ethylene polymers having improved processability and an MWD of less than about 2.9. Multiple reactors in series or parallel may be used to produce in-situ blended polymers. Each reactor can separately have a constrained geometry catalyst or a conventional Ziegler-Natta catalyst as needed for obtaining in-situ blended polymer with the desired properties as long as there is a constrained geometry catalyst in at least one reactor. Olefin polymers can be produced according to this invention which have low susceptibility to melt fracture, even under high shear stress conditions.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 3 OF 28 USPATFULL on STN  
 ACCESSION NUMBER: 97:103179 USPATFULL  
 TITLE: Method of packaging food products  
 INVENTOR(S): Chum, Pak-Wing Steve, Lake Jackson, TX, United States  
 Whiteman, Nicole F., Lake Jackson, TX, United States  
 PATENT ASSIGNEE(S): The Dow Chemical Company, Midland, MI, United States  
 (U.S. corporation)

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 5685128		19971111
APPLICATION INFO.:	US 1995-455176		19950531 (8)
RELATED APPLN. INFO.:	Division of Ser. No. US 1993-54334, filed on 28 Apr 1993, now patented, Pat. No. US 5427807 which is a continuation-in-part of Ser. No. US 1991-776130, filed on 15 Oct 1991, now patented, Pat. No. US 5272236		

DOCUMENT TYPE: Utility  
 FILE SEGMENT: Granted  
 PRIMARY EXAMINER: Wu, David W.  
 NUMBER OF CLAIMS: 10  
 EXEMPLARY CLAIM: 1  
 NUMBER OF DRAWINGS: 8 Drawing Figure(s); 7 Drawing Page(s)  
 LINE COUNT: 1074

AB Food products, especially fresh food products such as retail-cut red meat, vegetables and fruits, are packaged with a film having at least one film layer comprising a substantially linear ethylene polymer, preferably a polymer comprising ethylene and at least one  $\alpha$ -olefin

comonomer, e.g. 1-octene. The ethylene polymers used in the construction of the film structures used in this invention are prepared by constrained geometry catalyst technology. The film structures can be either mono- or multilayered, oriented or nonoriented, oxygen permeable or impermeable, and prepared by any conventional technique. The food products can be packaged by any conventional method, e.g. stretch overwrap, shrink, vacuum skin, on vacuum forming.

L3 ANSWER 4 OF 28 USPATFULL on STN

ACCESSION NUMBER: 95:57915 USPATFULL  
 TITLE: Method of packaging food products  
 INVENTOR(S): Chum, Pak-Wing S., Lake Jackson, TX, United States  
 Whiteman, Nicole F., Lake Jackson, TX, United States  
 PATENT ASSIGNEE(S): The Dow Chemical Company, Midland, MI, United States  
 (U.S. corporation)

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 5427807		19950627
APPLICATION INFO.:	US 1993-54334		19930426 (8)
DISCLAIMER DATE:	20101221		
RELATED APPLN. INFO.:	Continuation-in-part of Ser. No. US 1991-776130, filed on 15 Oct 1991, now patented, Pat. No. US 5272236		
DOCUMENT TYPE:	Utility		
FILE SEGMENT:	Granted		
PRIMARY EXAMINER:	Schofer, Joseph L.		
ASSISTANT EXAMINER:	Wu, David		
NUMBER OF CLAIMS:	32		
EXEMPLARY CLAIM:	1		
NUMBER OF DRAWINGS:	8 Drawing Figure(s); 7 Drawing Page(s)		
LINE COUNT:	1144		

AB Food products, especially fresh food products such as retail-cut red meat, vegetables and fruits, are packaged with a film having at least one film layer comprising a substantially linear ethylene polymer, preferably a polymer comprising ethylene and at least one  $\alpha$ -olefin comonomer, e.g. 1-octene. The ethylene polymers used in the construction of the film structures used in this invention are prepared by constrained geometry catalyst technology. The film structures can be either mono- or multilayered, oriented or nonoriented, oxygen permeable or impermeable, and prepared by any conventional technique. The food products can be packaged by any conventional method, e.g. stretch overwrap, shrink, vacuum skin, on vacuum forming.

L3 ANSWER 5 OF 28 USPATFULL on STN

ACCESSION NUMBER: 92:87135 USPATFULL  
 TITLE: Process for removing aldehydes and/or vinyl esters from gaseous or liquid process streams  
 INVENTOR(S): Welton, Donald E., Victoria, TX, United States  
 PATENT ASSIGNEE(S): Occidental Chemical Corporation, Niagara Falls, NY, United States (U.S. corporation)

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 5157205		19921020
APPLICATION INFO.:	US 1991-763772		19910923 (7)
DOCUMENT TYPE:	Utility		
FILE SEGMENT:	Granted		
PRIMARY EXAMINER:	McFarlane, Anthony		
LEGAL REPRESENTATIVE:	Fuerle, Richard D.		
NUMBER OF CLAIMS:	20		
EXEMPLARY CLAIM:	1		
LINE COUNT:	466		

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB Solutions of caustic and sulfite are used in a single step process to remove aldehydes and vinyl esters from gaseous and liquid process streams.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 6 OF 28 USPATFULL on STN

ACCESSION NUMBER: 89:28005 USPATFULL

TITLE: Process for **recovering ethylene-vinyl acetate copolymers** from an aqueous dispersion

INVENTOR(S): McClain, Dorothee M., Cincinnati, OH, United States

PATENT ASSIGNEE(S): National Distillers and Chemical Corporation, New York, NY, United States (U.S. corporation)

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 4820803		19890411
APPLICATION INFO.:	US 1985-802891		19851129 (6)
DOCUMENT TYPE:	Utility		
FILE SEGMENT:	Granted		
PRIMARY EXAMINER:	Schofer, Joseph L.		
ASSISTANT EXAMINER:	Reddick, J. M.		
LEGAL REPRESENTATIVE:	Tremain, Kenneth D.		
NUMBER OF CLAIMS:	20		
EXEMPLARY CLAIM:	1		
LINE COUNT:	909		

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The presence of a water-soluble substantially neutral salt significantly improves the recovery filtration of dispersions of **ethylene-vinyl acetate** polymers of 35 to 85 percent vinyl acetate content.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 7 OF 28 USPATFULL on STN

ACCESSION NUMBER: 88:67462 USPATFULL

TITLE: Ethylene copolymer

INVENTOR(S): Shimada, Takeo, Mie, Japan  
Ishino, Iwao, Mie, Japan  
Okada, Noriyuki, Mie, Japan  
Isaka, Tsutomu, Mie, Japan  
Oonishi, Akiyoshi, Mie, Japan  
Saito, Masaki, Ibaraki, Japan  
Doi, Shuhei, Mie, Japan

PATENT ASSIGNEE(S): Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan (non-U.S. corporation)

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 4778866		19881018
APPLICATION INFO.:	US 1986-882392		19860707 (6)

	NUMBER	DATE
PRIORITY INFORMATION:	JP 1985-149671	19850708
	JP 1985-149672	19850708
	JP 1985-248480	19851106

DOCUMENT TYPE: Utility

FILE SEGMENT: Granted

PRIMARY EXAMINER: Schofer, Joseph L.

ASSISTANT EXAMINER: Mulcahy, Peter

LEGAL REPRESENTATIVE: Oblon, Fisher, Spivak, McClelland & Maier

NUMBER OF CLAIMS: 4  
EXEMPLARY CLAIM: 1  
NUMBER OF DRAWINGS: 3 Drawing Figure(s); 2 Drawing Page(s)  
LINE COUNT: 695

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB An ethylene copolymer comprising an ethylene unit and an ester unit selected from ethylenically  $\alpha,\beta$ -unsaturated acid esters represented by the formula (I) or (II): ##STR1## wherein R.sup.1 represents a hydrogen atom or a methyl group; and R.sup.2 represents a halogenated alkyl group having from 1 to 15 carbon atoms; ##STR2## wherein R.sup.3 represents a hydrogen atom or a methyl group; and n represents 0 or 1,

wherein said ester unit is present in a total amount of from 0.001 to 10 mol %. The copolymer has excellent dielectric breakdown characteristics, such as electric treeing property, water treeing property, etc., and is useful as an insulating material for high-voltage cables.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 8 OF 28 USPATFULL on STN

ACCESSION NUMBER: 87:60308 USPATFULL

TITLE: Halogenated **ethylene-vinyl acetate**-isobutylene terpolymers

INVENTOR(S): Pritchett, Ervin G., Cincinnati, OH, United States  
Hoyt, John M., Cincinnati, OH, United States

PATENT ASSIGNEE(S): National Distillers and Chemical Corporation, New York, NY, United States (U.S. corporation)

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 4689370		19870825
APPLICATION INFO.:	US 1986-870261		19860603 (6)
DISCLAIMER DATE:	20030610		
RELATED APPLN. INFO.:	Continuation of Ser. No. US 1984-665595, filed on 29 Oct 1984, now patented, Pat. No. US 4594393		
DOCUMENT TYPE:	Utility		
FILE SEGMENT:	Granted		
PRIMARY EXAMINER:	Schofer, Joseph L.		
ASSISTANT EXAMINER:	Teskin, F. M.		
LEGAL REPRESENTATIVE:	Tremain, Kenneth D.		
NUMBER OF CLAIMS:	3		
EXEMPLARY CLAIM:	1		
LINE COUNT:	471		

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A halogenated **ethylene-vinyl acetate** -isobutene terpolymer is provided that has improved thermal stability.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 9 OF 28 USPATFULL on STN

ACCESSION NUMBER: 86:34285 USPATFULL

TITLE: Halogenated **ethylene/vinyl acetate**/isobutylene terpolymers

INVENTOR(S): Pritchett, Ervin G., Cincinnati, OH, United States  
Hoyt, John M., Cincinnati, OH, United States

PATENT ASSIGNEE(S): National Distillers and Chemical Corporation, New York, NY, United States (U.S. corporation)

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 4594393		19860610
APPLICATION INFO.:	US 1984-665595		19841029 (6)
DOCUMENT TYPE:	Utility		

FILE SEGMENT: Granted  
PRIMARY EXAMINER: Schofer, Joseph L.  
ASSISTANT EXAMINER: Teskin, F. M.  
LEGAL REPRESENTATIVE: Tremain, Kenneth D.  
NUMBER OF CLAIMS: 5  
EXEMPLARY CLAIM: 1  
LINE COUNT: 472

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A halogenated **ethylene-vinyl acetate**  
-isobutene terpolymer is provided that has improved thermal stability.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 10 OF 28 USPATFULL on STN

ACCESSION NUMBER: 85:37399 USPATFULL

TITLE: Process for producing polyethylene and an  
ethylene- $\alpha$ -olefin copolymer

INVENTOR(S): Fukawa, Isaburo, Fuji, Japan

Sato, Kazutoshi, Kurashiki, Japan

PATENT ASSIGNEE(S): Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan  
(non-U.S. corporation)

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 4525546		19850625
APPLICATION INFO.:	US 1983-552564		19831116 (6)

	NUMBER	DATE
PRIORITY INFORMATION:	JP 1982-207762	19821129
	JP 1982-208490	19821130
	JP 1983-1746	19830111
	JP 1983-1748	19830111
	JP 1983-167524	19830913

DOCUMENT TYPE: Utility

FILE SEGMENT: Granted

PRIMARY EXAMINER: Smith, Edward J.

LEGAL REPRESENTATIVE: Sprung Horn Kramer & Woods

NUMBER OF CLAIMS: 8

EXEMPLARY CLAIM: 1

LINE COUNT: 2027

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB Polyethylene and an ethylene- $\alpha$ -olefin copolymer are produced by polymerizing ethylene or a mixture of ethylene with an  $\alpha$ -olefin having 3 to 18 carbon atoms by use of a coordination polymerization catalyst containing a transition metal compound and an organometallic compound, deactivating said catalyst by adding a copolymer of at least one monomer selected from the group consisting of vinyl monomers having a carbonyl group represented by the formula: ##STR1## wherein R.sup.1 represents a hydrogen atom or a hydrocarbon group having 1 to 5 carbon atoms; R.sup.2 is a hydrogen atom or a hydrocarbon group having 1 to 20 carbon atoms; M represents a metal element; and m represents the valence of M,

or maleic anhydride with ethylene to be mixed with said catalyst, separating unaltered monomers from the polymer mixture.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 11 OF 28 USPATFULL on STN

ACCESSION NUMBER: 81:24646 USPATFULL

TITLE: Alcohol-wet particles of **ethylene-vinyl ester** interpolymer

INVENTOR(S): McClain, Dorothee M., Cincinnati, OH, United States



PATENT ASSIGNEE(S): National Distillers and Chemical Corp., New York, NY,  
United States (U.S. corporation)

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 4265799		19810505
APPLICATION INFO.:	US 1979-78530		19790924 (6)
RELATED APPLN. INFO.:	Division of Ser. No. US 1978-934647, filed on 17 Aug 1978, now patented, Pat. No. US 4217423		
DOCUMENT TYPE:	Utility		
FILE SEGMENT:	Granted		
PRIMARY EXAMINER:	Levin, Stanford M.		
LEGAL REPRESENTATIVE:	Tremain, Kenneth D.		
NUMBER OF CLAIMS:	4		
EXEMPLARY CLAIM:	1,3		
LINE COUNT:	372		

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB Particles of **ethylene-vinyl ester** interpolymer containing at least about 30% by weight of **copolymerized vinyl ester** which are produced in aqueous dispersion media when recovered from such media exhibit a tendency to coalesce into unmanageable agglomerates which is prevented herein by adding an anti-coalescing amount of a lower saturated aliphatic monohydroxyl alcohol such as ethanol or isopropanol to the dispersion media and recovering the interpolymer particles therein in the alcohol-wet condition.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 12 OF 28 USPATFULL on STN

ACCESSION NUMBER: 80:39427 USPATFULL

TITLE: Rapid filtration of **ethylene-vinyl ester** interpolymer particles from aqueous dispersions thereof

INVENTOR(S): McClain, Dorothee M., Cincinnati, OH, United States

PATENT ASSIGNEE(S): National Distillers and Chemical Corporation, New York, NY, United States (U.S. corporation)

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 4217423		19800812
APPLICATION INFO.:	US 1978-934647		19780817 (5)
DOCUMENT TYPE:	Utility		
FILE SEGMENT:	Granted		
PRIMARY EXAMINER:	Levin, Stanford M.		
LEGAL REPRESENTATIVE:	Tremain, Kenneth D.		
NUMBER OF CLAIMS:	9		
EXEMPLARY CLAIM:	1,7		
LINE COUNT:	388		

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The difficulty of successfully and rapidly filtering finely divided **ethylene-vinyl ester** interpolymer particles containing at least about 30% by weight of **copolymerized vinyl ester** from aqueous dispersion media is overcome by the addition of an anti-coalescing amount of a lower saturated aliphatic monohydroxyl alcohol such as ethanol or isopropanol to the aqueous dispersion media accompanied by, or followed with, agitation prior to recovering the interpolymer particles therefrom. Maintaining the filtered **ethylene-vinyl ester** interpolymer particles in the alcohol-wet condition resists the tendency of the particles to coalesce into unmanageable agglomerates, formation of which otherwise tends to limit or even preclude the use of the interpolymer with respect to some applications. Solid phase alcoholysis of the alcohol-wet **ethylene-vinyl ester**

interpolymer filter cake is also disclosed.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 13 OF 28 USPATFULL on STN

ACCESSION NUMBER: 80:19366 USPATFULL

TITLE: Method for recovering different plastic materials from laminated articles

INVENTOR(S): Watanabe, Tadao, Tokyo, Japan

PATENT ASSIGNEE(S): Toppan Printing Co., Ltd., Japan (non-U.S. corporation)

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 4199109		19800422
APPLICATION INFO.:	US 1978-917351		19780620 (5)
DOCUMENT TYPE:	Utility		
FILE SEGMENT:	Granted		
PRIMARY EXAMINER:	Lazarus, Richard B.		
LEGAL REPRESENTATIVE:	Lerner, David, Littenberg & Samuel		
NUMBER OF CLAIMS:	12		
EXEMPLARY CLAIM:	1		
NUMBER OF DRAWINGS:	3 Drawing Figure(s); 1 Drawing Page(s)		
LINE COUNT:	382		

AB A method for recovering plastics which is easy in working and effective in separation of materials. The method comprises the steps of: heating multilayer plastic articles, immediately crushing the heated plastic articles by means of shearing, impact or tearing force and peeling the layers of the plastic articles into small pieces of respective component layer materials, and separating the crushed and peeled pieces of materials into the respective component layer materials, thereby recovering the component layer materials in separated state.

L3 ANSWER 14 OF 28 USPATFULL on STN

ACCESSION NUMBER: 77:69288 USPATFULL

TITLE: Process for the continuous production of an **ethylene/vinyl acetate copolymer** dispersion

INVENTOR(S): Wiest, Hubert, Burghausen, Germany, Federal Republic of  
Hanzalik, Josef, Burghausen, Germany, Federal Republic of  
Lechner, Wilhelm, Burghausen, Germany, Federal Republic of

PATENT ASSIGNEE(S): Lieb, Erwin, Burghausen, Germany, Federal Republic of  
Wacker-Chemie GmbH, Munich, Germany, Federal Republic of (non-U.S. corporation)

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 4035329		19770712
APPLICATION INFO.:	US 1975-633591		19751119 (5)

	NUMBER	DATE
PRIORITY INFORMATION:	DE 1974-2456576	19741129
DOCUMENT TYPE:	Utility	
FILE SEGMENT:	Granted	
PRIMARY EXAMINER:	Hayes, Lorenzo B.	
LEGAL REPRESENTATIVE:	Hammond & Littell	
NUMBER OF CLAIMS:	5	
EXEMPLARY CLAIM:	1	
LINE COUNT:	479	

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A process for the continuous manufacture of an aqueous **ethylene**

/vinyl acetate copolymer dispersion which comprises continuously copolymerizing ethylene and vinyl acetate and optionally other  $\alpha$ -olefinically unsaturated monomers, in an aqueous emulsion in the presence of an emulsifier and/or a protective colloid, and in the presence of a free-radical-forming redox catalyst system of a reducing agent and an oxidizing agent as well, optionally, as a heavy metal salt, and recovering said ethylene/vinyl acetate copolymer dispersion, characterized by (a) the presence of a molar excess of at least 3 times, preferably from 3 to 10 times, said reducing agent over said oxidizing agent dosed into the reaction medium and (b) adding the monomers continuously to the reaction mixture at such a rate that the concentration of unreacted monomers at no place in the reaction zone exceeds 15% by weight of the total weight of the reaction mixture.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 15 OF 28 USPATFULL on STN  
ACCESSION NUMBER: 76:34979 USPATFULL  
TITLE: **Ethylene/vinyl acetate**  
/isobutylene terpolymer coating composition  
INVENTOR(S): Stiles, Claude J., Tuscola, IL, United States  
PATENT ASSIGNEE(S): National Distillers and Chemical Corporation, New York, NY, United States (U.S. corporation)

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 3965062		19760622
APPLICATION INFO.:	US 1974-524177		19741115 (5)
RELATED APPLN. INFO.:	Continuation of Ser. No. US 1972-288211, filed on 11 Sep 1972, now abandoned		
DOCUMENT TYPE:	Utility		
FILE SEGMENT:	Granted		
PRIMARY EXAMINER:	Hoke, V. P.		
LEGAL REPRESENTATIVE:	Tremain, Kenneth D.		
NUMBER OF CLAIMS:	8		
EXEMPLARY CLAIM:	1,5		
LINE COUNT:	265		

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB **Ethylene/vinyl acetate**/isobutylene terpolymers illustrating increased melt indices in combination with lower stiffness and Vicat softening temperatures are superior hot melt coating resins.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 16 OF 28 USPATFULL on STN  
ACCESSION NUMBER: 74:49039 USPATFULL  
TITLE: VINYL CHLORIDE-ETHYLENE COPOLYMERS AND THE PREPARATION THEREOF  
INVENTOR(S): Richardson, Dean E., La Marque, TX, United States  
Harkreader, Gordon G., South Charleston, WV, United States  
PATENT ASSIGNEE(S): Union Carbide Corporation, New York, NY, United States (U.S. corporation)

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 3843616		19741022
APPLICATION INFO.:	US 1970-13957		19700225 (5)
RELATED APPLN. INFO.:	Continuation-in-part of Ser. No. US 1966-546405, filed on 29 Apr 1966, now abandoned		
DOCUMENT TYPE:	Utility		

FILE SEGMENT: Granted  
PRIMARY EXAMINER: Levin, Stanford M.  
LEGAL REPRESENTATIVE: Finnegan, Reynold J.  
NUMBER OF CLAIMS: 3  
EXEMPLARY CLAIM: 1  
NUMBER OF DRAWINGS: 1 Drawing Figure(s); 1 Drawing Page(s)  
LINE COUNT: 573

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A method for producing porous vinyl chloride-ethylene copolymers containing at least 98.1 per cent by weight of vinyl chloride and 0.3 to 1.9 per cent by weight of ethylene which comprises continuous one-stage suspension polymerization of vinyl chloride and ethylene; and the vinyl chloride-ethylene copolymers produced thereby.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 17 OF 28 USPATFULL on STN

ACCESSION NUMBER: 74:28583 USPATFULL  
TITLE: PROCESS OF PREPARING STABLE AQUEOUS **ETHYLENE VINYL ESTER COPOLYMER** EMULSIONS

INVENTOR(S): Tsuchihara, Toyoji, Kanagawa, Japan  
Yawaka, Youhei, Kanagawa, Japan  
Noguchi, Takeshi, Osaka, Japan

PATENT ASSIGNEE(S): Showa Denko Kabushiki Kaisha, Tokyo, Japan (non-U.S. corporation)  
Kobunshi Kagaku Kogyo, Osaka, Japan (non-U.S. corporation)

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 3816362		19740611
APPLICATION INFO.:	US 1971-145011		19710519 (5)
RELATED APPLN. INFO.:	Continuation of Ser. No. US 1969-814959, filed on 10 Apr 1969, now abandoned		
DOCUMENT TYPE:	Utility		
FILE SEGMENT:	Granted		
PRIMARY EXAMINER:	Arnold, Donald J.		
ASSISTANT EXAMINER:	Lowe, James B.		
LEGAL REPRESENTATIVE:	Sughrue, Rothwell, Mion, Zinn & Macpeak		
NUMBER OF CLAIMS:	10		
NUMBER OF DRAWINGS:	3 Drawing Figure(s); 1 Drawing Page(s)		
LINE COUNT:	588		

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A process for preparing a stable aqueous **ethylene-vinyl ester copolymer** emulsion having a degree of polymerization of 600 to 4,000 and an ethylene content of 4 to 20 weight percent Emulsion polymerization is conducted at a temperature below 50°C in the presence of 0.02 to 0.2 percent of a redox catalyst until less than one percent of the monomer remains. The copolymer emulsion is then aged at a temperature of 50°C to 100°C for 0.5 to 5 hours.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 18 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2004:402939 CAPLUS  
DOCUMENT NUMBER: 140:407283  
TITLE: Recovery and reuse of residual ethylene from the production of **vinyl ester-ethylene copolymers**  
INVENTOR(S): Weitzel, Hans-Peter; Braunsperger, Robert  
PATENT ASSIGNEE(S): Wacker Polymer Systems GmbH & Co. KG, Germany  
SOURCE: Eur. Pat. Appl., 8 pp.

CODEN: EPXXDW  
DOCUMENT TYPE: Patent  
LANGUAGE: German  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1420034	A1	20040519	EP 2003-25496	20031106
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
DE 10253043	A1	20040603	DE 2002-10253043	20021114
US 2004097701	A1	20040520	US 2003-678365	20031003
PRIORITY APPLN. INFO.:			DE 2002-10253043 A	20021114

AB In the manufacture of the title copolymers by radical emulsion or suspension copolymn. of **ethylene** with **vinyl esters**, e.g., vinyl acetate in H<sub>2</sub>O at 5-100 bar, the reaction mixture is depressurized to 0.1-5 bar, the gas phase containing unreacted ethylene is compressed at 2-20 bar, combined with vinyl ester and the mixture used in the next polymerization batch.

REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L3 ANSWER 19 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
ACCESSION NUMBER: 2001:651491 CAPLUS  
DOCUMENT NUMBER: 135:196653  
TITLE: Reuse-preventive adhesive tapes with weak interfacial adhesion for purchased goods  
INVENTOR(S): Tezuka, Atsuo; Mochizuki, Hiroki; Murakami, Takeshi  
PATENT ASSIGNEE(S): Oji Takku K. K., Japan  
SOURCE: Jpn. Kokai Tokkyo Koho, 4 pp.  
CODEN: JKXXAF  
DOCUMENT TYPE: Patent  
LANGUAGE: Japanese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2001240826	A2	20010904	JP 2000-104145	20000229
PRIORITY APPLN. INFO.:			JP 2000-104145	20000229

AB The tapes comprise supports having resinous barrier layers and release layers in the order on the surface side and thermoplastic resin layers, films, primer layers, and pressure-sensitive adhesive layers in the order on the back side. The interlayer adhesion strength ( $\alpha$ ) between each pair of adjacent layers satisfies the following conditions;  $A > B > C > D$  ( $A = \alpha$  between primer layers and adhesive layers;  $B = \alpha$  between adhesive layers and marking objects;  $C = \alpha$  between thermoplastic resin layers and films;  $D = \alpha$  between release layers and adhesive layers). Some preferable materials for above layer components are shown in the disclosure.

L3 ANSWER 20 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
ACCESSION NUMBER: 1999:678235 CAPLUS  
DOCUMENT NUMBER: 131:287518  
TITLE: Multilayer olefin polymer shrinkable packaging films with improved impact resistance and indentation recovery  
INVENTOR(S): Matsuki, Yutaka  
PATENT ASSIGNEE(S): Asahi Chemical Industry Co., Ltd., Japan  
SOURCE: Jpn. Kokai Tokkyo Koho, 9 pp.  
CODEN: JKXXAF  
DOCUMENT TYPE: Patent  
LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 11291421	A2	19991026	JP 1998-95748	19980408

PRIORITY APPLN. INFO.: JP 1998-95748 19980408

AB In title films with heat shrinkage 20-50% at 80° having ≥4 layers containing surface layers and propylene polymer internal layers, other internal layers contain (A) 5-40 parts α-olefin-monovinylidene aromatic monomer copolymers with modulus 30-1000 kg/cm<sup>2</sup>, (B) 40-80 parts (15-60% for total films) ethylene-α-olefin copolymers with d. 0.890-0.925 g/cm<sup>3</sup> and melt flow rate 0.2-5.0 g/10 min (at 190°, 2.16 kg-load), and (C) 5-55 parts EVA, ethylene-unsatd. fatty acid (ester) copolymers, propylene polymers, and/or butene-1 polymers. Thus, a film having an internal layer containing ethylene-styrene copolymer (modulus 640 kg/cm<sup>2</sup>), ethylene-octene-1 copolymer, EVA, butene-1-ethylene-propylene copolymer, and butene-1-propylene copolymer showed high impact resistance and good indentation recovery.

L3 ANSWER 21 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1997:211980 CAPLUS

DOCUMENT NUMBER: 126:239301

TITLE: **Recovery of ethylene-vinyl acetate** (EVA) from industrial waste

AUTHOR(S): Zattera, A. J.; Almeida, M. G.; Mondadori, N. L.; Zeni, M.

CORPORATE SOURCE: Dep. Ing. Quimica, Univ. Caxias do Sul, Caxias do Sul, 95001-970, Brazil

SOURCE: Informacion Tecnologica (1997), 8(1), 103-106

CODEN: ITECFG; ISSN: 0716-8756

PUBLISHER: Centro de Informacion Tecnologica

DOCUMENT TYPE: Journal

LANGUAGE: Spanish

AB **Recovery of ethylene-vinyl acetate**

**copolymer** (EVA) from production stream wastes was carried out by comminution to maximum particle size of 2.38 mm. Polymer blends were prepared by mixing HDPE and the recovered EVA and the mech. properties of HDPE/EVA blends were measured through tensile and viscoelastic tests. The recovery of EVA residue is economically feasible and the resulting blends present good impact resistance characteristics.

L3 ANSWER 22 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1990:180413 CAPLUS

DOCUMENT NUMBER: 112:180413

TITLE: Transformation of LDPE plant

AUTHOR(S): Li, Zhenjiang

CORPORATE SOURCE: Plast. Plant, Shanghai Petrochem. Complex, Shanghai, Peop. Rep. China

SOURCE: Shiyu Huagong (1989), 18(11), 764-8

CODEN: SHHUE8; ISSN: 1000-8144

DOCUMENT TYPE: Journal

LANGUAGE: Chinese

AB Tech. transformation and improvement in operation and environment of LDPE production plant were described including preinjection of liquid mol. weight regulators, melting method in place of solvent method in feeding additives, installment of addnl. separators for **recovery of ethylene**, production of **ethylene-vinyl acetate copolymer**, and adjustment of location of cooling system, etc.

L3 ANSWER 23 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1989:458555 CAPLUS

DOCUMENT NUMBER: 111:58555

TITLE: Process for **recovering ethylene-vinyl acetate copolymers**  
 from an aqueous dispersion  
 INVENTOR(S): McClain, Dorothee M.  
 PATENT ASSIGNEE(S): Quantum Chemical Corp., USA  
 SOURCE: U.S., 10 pp.  
 CODEN: USXXAM  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 4820803	A	19890411	US 1985-802891	19851129
PRIORITY APPLN. INFO.:			US 1985-802891	19851129

AB EVA containing 25-85% vinyl acetate, or hydrolyzed EVA, are recovered from aqueous dispersions as dry powders with decreased energy consumption by stirring the molten EVA in an aqueous dispersion containing a soap, cooling, converting the soap to a free acid or alkaline earth soap, adding 3-5% (based on H<sub>2</sub>O) H<sub>2</sub>O-soluble, neutral salt, filtering, and drying. Stirring a dispersion of 60.75:39.25 EVA 450, Na stearate 15, and H<sub>2</sub>O 450 g at 200° for 10 min, cooling to 90°, adding to a solution of Na<sub>2</sub>SO<sub>4</sub> 77.5, Ca(OH)<sub>2</sub> 2, and H<sub>2</sub>O 1200 g, stirring, and vacuum filtering at 23° gave a filter cake containing 53.1% solids, with good separation

L3 ANSWER 24 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
 ACCESSION NUMBER: 1979:524222 CAPLUS  
 DOCUMENT NUMBER: 91:124222  
 TITLE: Ethylene copolymers  
 INVENTOR(S): Zacher, Wieland; Pfleger, Klaus; Boettcher, Klaus; Skorczyk, Ronald; Buechner, Oskar  
 PATENT ASSIGNEE(S): BASF A.-G., Fed. Rep. Ger.  
 SOURCE: Ger. Offen., 13 pp.  
 CODEN: GWXXBX  
 DOCUMENT TYPE: Patent  
 LANGUAGE: German  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 2802866	A1	19790726	DE 1978-2802866	19780124
US 4217431	A	19800812	US 1979-2330	19790110
CA 1130045	A1	19820817	CA 1979-319541	19790112
JP 54105192	A2	19790817	JP 1979-2323	19790116
EP 3324	A2	19790808	EP 1979-100145	19790118
EP 3324	A3	19790822		
EP 3324	B1	19820203		
EP 3324	B2	19860430		
R: BE, DE, FR, GB				
AT 7900475	A	19800815	AT 1979-475	19790123
AT 361707	B	19810325		
PRIORITY APPLN. INFO.:			DE 1978-2802866	19780124

AB C<sub>2</sub>H<sub>4</sub> is polymerized continuously with comonomers at 150-350°/1500-5000 bar, the product separated at 150-250°/100-500 bar and then at 150-250°/1-10 bar, the gases from the latter stage are compressed and cooled, and the separated comonomers are recycled. Thus, 9460 kg/h C<sub>2</sub>H<sub>4</sub>, 1415 kg/h vinyl acetate (I), and 0.0015 mol% (based on C<sub>2</sub>H<sub>4</sub>) O is heated in a pipe reactor at ≤305°/2100 bar, separated at 220°/300 bar and then at 210°/3 bar to give 1780 kg/h homogeneous 87.0:13.0 C<sub>2</sub>H<sub>4</sub>-I polymer [24937-78-8], d. 0.934, melt index

4.12 g/10 min, with recovery and recycle of 48.6 kg/h I from offgas containing 0.2% I.

L3 ANSWER 25 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
ACCESSION NUMBER: 1970:404582 CAPLUS  
DOCUMENT NUMBER: 73:4582  
TITLE: **Ethylene-vinyl acetate copolymers**  
INVENTOR(S): French, Richard J.  
PATENT ASSIGNEE(S): National Distillers and Chemical Corp.  
SOURCE: U.S., 4 pp.  
CODEN: USXXAM  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 3509115	A	19700428	US 1968-783106	19681211
NL 6918481	A	19700615	NL 1969-18481	19691209
BE 742902	A	19700514	BE 1969-742902	19691210
FI 49313	B	19750131	FI 1969-3588	19691210
FR 2025887	A5	19700910	FR 1969-42840	19691211
BR 6915005	A0	19730125	BR 1969-215005	19691211
PRIORITY APPLN. INFO.:			US 1968-783106	19681211

AB In the preparation of **ethylene (I)-vinyl acetate copolymers** at elevated temperature and pressure, using a high-pressure recovery step to remove unused I, the improvement of reducing the temperature during the recovery by adding I feed material to the product prior to the recovery step resulted in reduction of the AcOH odor in the copolymer without deleteriously affecting its properties. The product obtained without adding an ethylene stream to the separator contained an average  $747 \pm 138$  ppm AcOH compared to  $49 \pm 12$  ppm with the separator. A peroxy free-radical catalyst is optionally used while passing the reaction mixture through a pressure reduction zone and into the separator.

L3 ANSWER 26 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
ACCESSION NUMBER: 1969:450988 CAPLUS  
DOCUMENT NUMBER: 71:50988  
TITLE: Olefin-vinyl alcohol copolymers  
INVENTOR(S): Gardner, Donald M.; Martins, Joseph Galvan; Monaghan, Leo J.  
PATENT ASSIGNEE(S): Monsanto Co.  
SOURCE: Fr., 13 pp.  
CODEN: FRXXAK  
DOCUMENT TYPE: Patent  
LANGUAGE: French  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
FR 1545494		19681108		
GB 1190018			GB	
US 3585177		19710000	US	

PRIORITY APPLN. INFO.: US 19661130  
AB Packaging material for food, medicines, and related substances is prepared by copolymering a lower  $\alpha$ -olefin with a vinyl ester in the presence of a free radical initiator in an O-free medium under constant temperature and pressure, rapidly stopping the polymerization with a conversion rate of 1-70%, recovering the **olefin-vinyl ester copolymer**, hydrolyzing the **copolymer** to give an olefin-vinyl alc. copolymer (I), and treating the copolymer with heat and pressure to fashion it into



a packaging article. I contains 5-40 weight % olefin and <3% residual ester groups and has a D.T.A. (constituted by a single straight endotherm) having a melting interval <30°. The packaging materials are characterized by O permeability <1 ml./645 cm.2/24 hrs./cm. Hg./25 µ at 23° and water vapor permeability <8.5 g./645 cm.2/24 hrs./25 µ at 23° and relative humidity 100%. Thus, 1.125 g. solid iso-Pr percarbonate was added to 1250 g. vinyl acetate precooled to -40°, the solution added to 1250 g. vinyl acetate, the contents kept under an ethylene pressure of 7 kg./cm.2, the temperature raised to 45° and the pressure to 31.5 kg./cm.2 for 4 hrs. to give a monomer conversion of 35.8%, the contents cooled to 20° and poured into 2 vols. MeOH containing 0.1% styrene inhibiting monomer to avoid homopolymn., the **vinyl acetate-ethylene resin recovered** during 24 hrs. by disintegration of the mass in hexane to give a resin which, after drying overnight at 75°, contained 13.5% ethylene and had viscosity index 0.763 dl./g. in toluene at 25°, the polymer hydrolyzed with a 4% NaOH solution in MeOH to give an ethylene-vinyl alc. copolymer having viscosity index 1.414 dl./g. in Me2SO at 25° and a D.T.A. curve having 1 straight melting endotherm with a interval at 15° and a min. at 177° indicating a straight distribution range of ethylene in the polymer and the absence of homopolymer. Similar results were obtained using propylene and isobutylene as olefins. Mixing the copolymer with the usual stabilizers and antioxidants followed by extrusion with the extrudate 320-40° and the matrix at 390-410° gave clear, 25-175 µ thick film having water vapor permeability 7.4 g./645 cm.2/24 hrs./25 µ at 23° and relative humidity 100% and O permeability 0.16 ml./645 cm.2/24 hrs./cm. Hg/25 µ at 23°.

L3 ANSWER 27 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1969:97387 CAPLUS

DOCUMENT NUMBER: 70:97387

TITLE: Monomer **recovery** during **ethylene-vinyl acetate copolymerization**

INVENTOR(S): Otsuka, Eiji; Takahashi, Itaru; Sasaki, Nobuo; Negoro, Haruo

PATENT ASSIGNEE(S): Toyo Koatsu Industries, Ltd.

SOURCE: Jpn. Tokkyo Koho, 5 pp.

CODEN: JAXXAD

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 43022848	B4	19681002	JP	19650129

AB Separation and purification of unreacted monomers during the **copolymn** of **ethylene** with **vinyl acetate** and reuse of these unreacted monomers is described. Thus, the **copolymn.** of **ethylene** with **vinyl acetate** was carried out in the presence of tert-Bu2O2 dissolved in n-hexane under 1000 atmospheric and at 200°, and the mixture obtained was sent to a high-pressure separation vessel kept under 300 atmospheric at 200°, and separated into a gas mixture containing 800 kg. **ethylene**, 240 kg. **vinyl acetate**, 10 kg. ethane, 5 kg. methane, 1 kg. **ethylene-vinyl acetate copolymer**, and a liquid material which would normally be discarded. The liquid material containing 100 kg. **ethylene**, 30 kg. **vinyl acetate**, 1 kg. low-mol.-weight **ethylene-vinyl acetate copolymer**, 0.8 kg. poly(vinyl acetate), 1 kg. polyethylene, 1.5 kg. ethane, and 0.5 kg. methane, was sent to a washing tower, and washed with a solution of 52 kg. toluene containing 0.01 kg. Cu naphthenate, and 95 kg.

ethylene, and 29 kg. vinyl acetate were collected and reused. The quality of product obtained by this method was improved, and the variation of m.p. and d. were 1.0 and 0.95, whereas those of the product obtained by conventional processes were 1.0-1.5 and 0.95-0.97.

L3 ANSWER 28 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
ACCESSION NUMBER: 1968:420032 CAPLUS  
DOCUMENT NUMBER: 69:20032  
TITLE: Polyethylene graft polymers  
INVENTOR(S): Raetzsch, Manfred; Kilian, Rolf  
PATENT ASSIGNEE(S): VEB Leuna-Werke "Walter Ulbricht"  
SOURCE: Brit., 4 pp.  
CODEN: BRXXAA  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
GB 1113821		19680515	GB	19660124
DE 1645617			DE	

AB Ethylene and an initiator are injected into a tubular reactor and polymerized at high temperature and pressure. Within 80-150 sec. after the addition of the **ethylene** and initiator, **vinyl acetate**, acrylonitrile, or Me methacrylate is also injected into the tubular reactor. The second monomer is graft copolymer with the polyethylene to give a graft polymer which can be type-printed and bonded to other materials without difficulty and which has improved transparency. The mech. strength of the polyethylene is not degraded because the graft polymer contains <10% of the 2nd monomer. The graft copolymer has the advantage of being a 1-step process, compared with prior art processes for preparing graft copolymers. Thus, 900 kg. ethylene was introduced during 1 hr. at 190°/1500 atmospheric into a reactor heated at 215°. An initiator comprising a solution of 0.15 kg. tert-BuOOBz in 3.5 kg. paraffin oil was also introduced into the reactor during 1 hr. The monomer-initiator mixture required 97 sec. to pass through the first 160 m. of the reactor (300 m. total length), and the reaction temperature was 250°. At this point, 8.0 kg. vinyl acetate was added to the reactor during 1 hr. The graft copolymer was expanded into a subsequent separator at 250 atmospheric, and the unconverted ethylene was recycled. The polymer and the recycle gas contained only traces of vinyl acetate. The hourly yield of solid polyethylene graft **copolymer** (**vinyl acetate** content 6.3%) was 106 kg. The polymer (melt index 2.1 g./10 min., tensile strength 117 kg./cm.2, and d. 0.925 g./cc.) was useful for preparing fine films and paper coverings capable of being printed without difficulty.

=> d 13 25 hit

L3 ANSWER 25 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
TI **Ethylene-vinyl acetate copolymers**  
AB In the preparation of **ethylene (I)-vinyl acetate copolymers** at elevated temperature and pressure, using a high-pressure recovery step to remove unused I, the improvement of reducing the temperature during the recovery by adding I feed material to the product prior to the recovery step resulted in reduction of the AcOH odor in the copolymer without deleteriously affecting its properties. The product obtained without adding an ethylene stream to the separator contained an average 747 ± 138 ppm AcOH compared to 49 ± 12 ppm with the separator. A peroxy free-radical catalyst is optionally used while passing the reaction mixture through a pressure reduction zone and into the separator.  
ST **ethylene vinyl acetate copolymers;**

**vinyl acetate ethylene copolymers;**  
**acetic acid removal polymers**

IT Polymerization

(of **ethylene** with **vinyl acetate**,  
high-pressure **ethylene recovery** in, temperature effect  
on)

IT 24937-78-8P, preparation

RL: PREP (Preparation)

(high-pressure **ethylene recovery** in, temperature effect  
on)

=> d 13 17 hit

L3 ANSWER 17 OF 28 USPATFULL on STN

TI PROCESS OF PREPARING STABLE AQUEOUS **ETHYLENE VINYL**  
**ESTER COPOLYMER EMULSIONS**

AB A process for preparing a stable aqueous **ethylene-**  
**vinyl ester copolymer** emulsion having a  
degree of polymerization of 600 to 4,000 and an ethylene content of 4 to  
20 weight percent Emulsion polymerization is conducted at a temperature  
below 50°C in the presence of 0.02 to 0.2 percent of a redox  
catalyst until less than one percent of the monomer remains. The  
copolymer emulsion is then aged at a temperature of 50°C to  
100°C for 0.5 to 5 hours.

SUMM This invention relates to aqueous emulsions of **vinyl**  
**ester-ethylene copolymer** which are suitably  
used especially as paints and coatings.

SUMM Processes for the preparation of aqueous emulsions of **copolymers**  
of **vinyl ester** and **ethylene** are known in  
the literature, e.g., U.S. Pat. No. 2,397,260, U.S. Pat. No. 2,703,794,  
British Patent No. 582,093, British Patent No. 813,814, British Pat. No.  
1,127,085 and Notification of Japanese Patent Application (Publication  
No.) 8988/1963. Uses of **vinyl ester-ethylene**  
**copolymers** which have been mentioned in such disclosures  
include, for example, textile finishes, adhesives and coatings. However,  
acrylic resin-based coatings have hitherto been used for exterior  
application in place of the conventional vinyl acetate-based aqueous  
emulsion paints because of poor weather resistant properties, especially  
poor water and wash resistant properties of the latter.

SUMM It is an object of the present invention to provide an aqueous emulsion  
of **vinyl ester-ethylene copolymer**  
which will give a coating film with improved weathering, washing and  
pigment binding properties.

SUMM In accordance with the present invention, there is provided an aqueous  
emulsion comprising a **vinyl ester-ethylene**  
**copolymer** having an ethylene content of 4 to 20 percent by  
weight and a degree of polymerization of 600 to 4,000. The aqueous  
emulsion of the present invention is superior in various properties,  
especially as regards the wash resistance and alkali resistance of the  
film coating formed therefrom, to the conventional vinyl acetate-based  
aqueous emulsions. Further, the coating film formed from the aqueous  
emulsion of the present invention is comparable in durability to the  
acrylic resin-based coating film.

SUMM In the accompanying drawings, FIGS. 1 to 3 indicate the wash resistance  
of a coating film of **vinyl ester-ethylene**  
**copolymers** plotted against ethylene content and degree of  
polymerization. The wash resistance test was made in the following  
manner.

- SUMM An aqueous paint comprising 15 parts (all parts are by weight) of titanium white, 3 parts of talcum powder, 22 parts of calcium carbonate, 14 parts of a 2 percent aqueous solution of a hydroxyethylcellulose, one part of ethyleneglycol, 15 parts of water and 18 parts of a 50 wt. percent aqueous emulsion of **ethylene-vinyl acetate copolymer** is applied in a thickness of 5 mils on a slate and after air drying for 5 days, subjected to a washing test in 0.5 percent soapy water in a Gardner-type washability tester. The degree of polymerization of the **vinyl acetate-ethylene copolymer** is calculated by the equation for calculation of degree of polymerization of polyvinyl acetate according to JIS K-6725. The ethylene content of the **vinyl acetate-ethylene copolymer** is determined by an alkali hydrolysis process. In this hydrolysis process, a 1 gram sample of the polymer is disclosed in 100 ml of a solution of acetone, methanol and water (5:3:2). An aqueous alcoholic 0.5 N sodium hydroxide solution (methanol: water = 9:1) is then added and hydrolysis allowed to occur for two hours at 40° - 45°C. At the end of this time, unreacted sodium hydroxide is titrated with 0.5 N hydrochloric acid and the ethylene content determined.
- SUMM It will be noticed that **vinyl acetate-ethylene copolymers** having an ethylene content of 4 to 20 percent by weight (as indicated by FIG. 1) and a degree of polymerization of at least 600 (as indicated by FIG. 2 and 3) have excellent wash resistance. In view of the above and the difficulty as a practical matter, of effectively producing stable aqueous emulsions of **vinyl ester-ethylene copolymers** having a degree of polymerization of more than 4,000, the degrees of polymerization of the copolymers of this invention will be between 600 and 4,000.
- SUMM The aqueous emulsion of the **vinyl ester-ethylene copolymers** of the present invention may be prepared in any conventional manner. In general, the emulsion is obtainable by polymerizing a **vinyl ester** and **ethylene** in emulsion in an aqueous medium by the aid of a catalyst or irradiation by, e.g., Co.sup.60.
- SUMM Although an aqueous emulsion of **vinyl ester copolymer** which has been prepared in emulsion polymerization in the presence of a protective colloid produces coatings which generally possess somewhat inferior properties, especially in wash resistance, to one which has been prepared without using any protective colloid, in accordance with the present invention there are obtained emulsions which produce coatings possessing excellent properties, in spite of the use of a protective colloid, as shown in FIGS. 1 to 3.
- SUMM The emulsion thus obtained may be subjected to a variety of uses and additives may be employed according to the contemplated use. Although it is normally desired that the emulsion not contain unreacted monomer (vinyl ester), the presence of such unreacted monomer in the amount of up to 1 percent by weight of the whole emulsion is permissible for some uses. In general, the aqueous emulsion of **vinyl ester-ethylene copolymer** is put to use as it is, while, of course, the **vinyl ester-ethylene copolymer recovered** from the reaction system may be re-dispersed in an aqueous medium by the aid of a suitable dispersing agent to form an aqueous emulsion for use.
- SUMM As a result of various investigations considering these circumstances, we have found that by aging at an elevated temperature subsequent to emulsion polymerization in the presence of a redox catalyst, there is obtained a stable emulsion which has excellent stability in the presence

of the various noted above and exhibits an improved coating properties when used as binder or vehicle for pigment for aqueous coatings. This is to say, the improved emulsion of **vinyl ester-ethylene copolymer** is obtainable by polymerizing in emulsion a **vinyl ester** and **ethylene** at a temperature not exceeding 50°C in the presence of a redox catalyst in an aqueous phase, to form a **vinyl ester-ethylene copolymer** of a combined ethylene content of 4 to 20 percent by weight and of a polymerization degree of 600 to 4,000 and aging the resulting emulsion at a temperature exceeding 50°C but not exceeding 100°C, and that this is a feature of the present invention. The change in ethylene content and in degree of polymerization during the aging is negligible. The aging is performed by maintaining the aqueous emulsion at a temperature exceeding 50°C but not exceeding 100 °C while stirring. Temperatures below 50°C will not sufficiently bring about the effect, while temperatures exceeding 100 °C will cause a breakdown of the emulsion. The optimum aging temperature ranges between 60° and 90°C. The presence of ethylene during the aging has no substantial effect on the resulting emulsion, so that the aging is conveniently carried out in the presence of ethylene under a pressure of from the polymerization pressure to atmospheric pressure. The aging time usually is 0.5 to 5 hours. Aging for less than 0.5 hour will not bring about sufficient results, and the aging for more than 5 hours does not result in any additional advantage. The most effective and economical aging conditions for individual emulsions may be selected from within the above ranges.

SUMM Aqueous emulsions of **vinyl ester-ethylene copolymers** prepared in accordance with the present invention, as set forth above, possess various properties, being much more stable than those prepared by conventional redox polymerization and are of very great value as surface finishes for textile fabrics and paper and as pigmented aqueous coatings.

DETD Run (2): An emulsion was prepared in the same manner as in Run (1) except that there was used 2.4 parts of ammonium persulfate. The emulsion thus obtained contained 49.8 percent of a copolymer having an average degree of polymerization of 331 and an ethylene content of 10.3 percent. For comparison with Run (1), in the following table were summarized the properties of the coating films prepared from the emulsion of this run, and of a commercially available **vinyl acetate-ethylene copolymer** emulsion, a polyvinyl acetate emulsion and a polyacrylate emulsion, all conventionally employed for coatings.  
##SPC1##

DETD The above table illustrates that the properties of the emulsion of **vinyl acetate-ethylene copolymer** of the present invention are comparable with that of a commercially available acrylate emulsion and that the emulsion prepared in Run (2) resembles the commercially available **vinyl acetate-ethylene copolymer** emulsion in properties.

CLM What is claimed is:

1. A batch process for preparing a stable aqueous **ethylene-vinyl ester copolymer** emulsion having a wash resistance of at least 5,000 strokes and excellent water and alkali resistance and having a solids content of from 47.8 to 52.6 percent, said vinyl ester being vinyl acetate or vinyl propionate and said copolymer having an ethylene content of from 4 to 20 percent by weight and a degree of polymerization of from 600 to 4,000, said process consisting of: 1. preparing an initial aqueous emulsion by adding, to an aqueous medium consisting essentially of, in addition to ethylene, an emulsifier, a protective colloid and water; said vinyl ester in an amount not exceeding 1.5 times by weight based on the weight of said

aqueous medium; 2. emulsion polymerizing said **vinyl ester** and **ethylene** at a temperature not exceeding 50°C. in the presence of from 0.02 to 0.2 percent by weight, based on the weight of said initial aqueous emulsion, of a redox catalyst for a period of time sufficient to form an intermediate aqueous **ethylene-vinyl ester copolymer** emulsion containing less than 1 percent by weight, based on the weight of said intermediate aqueous copolymer emulsion, of unreacted monomer; and 3. aging the intermediate aqueous emulsion at a temperature of from 50° to 100°C. for a period of time of from 0.5 to 5 hours to

=> d 13 16 hit

L3 ANSWER 16 OF 28 USPATFULL on STN

SUMM Free-radical vinyl polymerization initiators which can be used in the present process invention include diacyl peroxides, alkyl peroxydicarbonates, azo initiators, and the like. It is preferred to employ as the diacyl peroxides such compounds as dilauroyl peroxide, dicapryloyl peroxide, benzoyl peroxide and the like. The preferred azo initiators include azobisisobutyronitrile,  $\alpha$ ,  $\alpha'$ -azodicyclohexanecarbonitrile, azobis  $\alpha$ ,  $\alpha'$ -dimethylvaleronitrile, dimethyl- $\alpha$ ,  $\alpha'$ -azodiisobutyrate, and the like. Preferred alkyl peroxy dicarbonates include isopropylperoxy dicarbonate, butyl peroxy dicarbonate, isobutyl peroxy dicarbonate, and the like. The choice of polymerization temperature will determine the actual initiator employed. Thus, for example, where temperatures of 35°-55°C. are used, alkyl peroxy dicarbonates are preferred. Where temperatures in the 55°-70°C. range are used, diacyl peroxides are preferred. Where temperatures in the 65°-80°C. range are used, azo initiators are preferred. The preparation of the vinyl chloride polymers of this invention is conveniently carried out in jacketed, agitated autoclaves capable of withstanding pressures up to about 500 psig. The exact design and shape are not critical. The operating pressures employed in this invention are determined by the combined autogeneous pressure generated by the vinyl chloride and ethylene monomeric reactants. The preferred operating pressures are about 100 to 400 psig. In this pressure range up to about 25 percent at most of the ethylene monomer charged polymerizes with vinyl chloride. The remainder can be **recovered** as **ethylene** monomer.

SUMM A distinguishing feature of the instant suspension process invention and that of the prior art cited above is the fact that the instant invention involves the polymerization of a liquid vinyl chloride monomer and a monofunctional gaseous ethylene monomer, while the prior art teaches the homopolymerization of liquid vinyl chloride and the copolymerization of liquid vinyl chloride and difunctional liquid **copolymerizable** monomers, such as **vinyl esters** of alkanolic acids, e.g., vinyl acetate, vinylidene chloride, esters of acrylic acid, etc. Moreover, the effect of producing the instant vinyl chloride-ethylene copolymers by the suspension process of the instant invention having extremely better dryblendability and porosity than a vinyl chloride homopolymer produced by the same process is indeed surprising in view of the fact that no such substantial improvement was found when a similar **vinyl chloride-acetate copolymer** was also prepared by the same method.

DETD The following Examples 12, 13 and 14 demonstrates that the vinyl chloride-ethylene copolymers of this invention produced by the instant suspension process have extremely better dryblendability and sorption properties than either a vinyl chloride homopolymer or a **vinyl**

chloride-**acetate copolymer** prepared by the same method.

DETD The polymerization of Example 12 was repeated except that the monomer charge consisted of 1,379 lb. of vinyl chloride and 21 lb. of vinyl acetate to produce a vinyl chloride-**vinyl acetate copolymer**. Analysis of the resin is shown in Table III. Reaction time was 4 hours.

DETD TABLE III

	EXAMPLES		
	12	13	14
% Vinyl Chloride	100	98.7	99
% Vinyl Acetate	--	1.3	--
% Ethylene	--	--	1.0
Dryblend time minutes	5.0	5.2	4.0
ASTM Sorption, pphr	95	95.2	103

=> d 13 14 hit

L3 ANSWER 14 OF 28 USPATFULL on STN

TI Process for the continuous production of an **ethylene/vinyl acetate copolymer** dispersion

AB A process for the continuous manufacture of an aqueous **ethylene/vinyl acetate copolymer** dispersion which comprises continuously **copolymerizing ethylene** and **vinyl acetate** and optionally other  $\alpha$ -olefinically unsaturated monomers, in an aqueous emulsion in the presence of an emulsifier and/or a protective colloid, and in the presence of a free-radical-forming redox catalyst system of a reducing agent and an oxidizing agent as well, optionally, as a heavy metal salt, and **recovering** said **ethylene/vinyl acetate copolymer** dispersion, characterized by (a) the presence of a molar excess of at least 3 times, preferably from 3 to 10 times, said reducing agent over said oxidizing agent dosed into the reaction medium and (b) adding the monomers continuously to the reaction mixture at such a rate that the concentration of unreacted monomers at no place in the reaction zone exceeds 15% by weight of the total weight of the reaction mixture.

SUMM Processes for the continuous **copolymerization** of **ethylene** and **vinyl esters** have been described in U.S. Pat. No. 2,703,794 and in German Offenlegungsschriften Nos. (DOS) 1,720,467 and 1,900,112. In these processes, however, the polymerization does not progress at a satisfactory speed nor in a uniform manner, and there is also the disadvantage of the formation of wall deposits. Because of these factors, the advantages expected from continuous polymerization as compared with discontinuous or batch polymerization, such as a greater space/time yield and a better product uniformity, have not been realized in these processes.

SUMM An object of the present invention is the development of a continuous process for the production of an aqueous **ethylene/vinyl acetate copolymer** dispersion at a high space/time yield without formation of wall deposits on the reactor walls.

SUMM Another object of the present invention is the development of a continuous process for the manufacture of an aqueous **ethylene/**

**vinyl acetate copolymer** dispersion, which comprises continuously **copolymerizing ethylene** and **vinyl acetate**, in a confined reaction zone, in an aqueous emulsion, in the presence of an emulsifier and/or protective colloid, and in the presence of a free-radical-forming water-soluble redox catalyst system comprising a reducing agent and an oxidizing agent in a molar ratio of at least 3:1, while adding the monomers at such a rate that the concentration of unreacted monomers at no place in the reaction zone exceeds 15% by weight of the total weight of the reaction mixture in the reaction zone.

SUMM The present invention provides a continuous process for the manufacture of an aqueous **ethylene/vinyl acetate copolymer** dispersion, which comprises continuously **copolymerizing ethylene** and **vinyl acetate** and optionally other  $\alpha$ -olefinically unsaturated monomers, in a confined reaction zone in an aqueous emulsion, in the presence of an emulsifier and/or protective colloid, and in the presence of a free-radical-forming water-soluble redox catalyst system comprising a reducing agent and an oxidizing agent in a molar ratio of at least 3:1, optionally with a heavy metal salt, while adding the monomers at such a rate that the concentration of unreacted monomers at no place in the reaction zone exceeds 15% by weight of the total weight of the reaction mixture in the reaction zone.

SUMM More particularly, therefore, the present invention relates to an improvement in the process for the continuous manufacture of an aqueous **ethylene/vinyl acetate copolymer** dispersion, which comprises continuously adding a monomer mixture of **ethylene** and **vinyl acetate** containing up to 40% by weight of the share of the vinyl acetate of an  $\alpha$ -olefinically unsaturated monomer **copolymerizable** with **ethylene** and **vinyl acetate**, in an aqueous emulsion containing emulsifiers and/or protective colloids, to a confined reaction zone, together with the continuous adding of a free-radical-forming water-soluble redox catalyst system comprising a reducing agent and an oxidizing agent and from 0 to 50 ppm, based on the total monomers, of a heavy metal in the form of a heavy metal salt, maintaining said confined reaction zone at a temperature sufficient to effect polymerization and continuously withdrawing an aqueous **ethylene/vinyl acetate copolymer** dispersion from said confined reaction zone, the improvement which consists of (a) continuously adding said reducing agent and said oxidizing agent in a molar ratio of at least 3:1 and (b) continuously adding said monomer mixture at such a rate that the concentration of unreacted monomers at no place in said confined reaction zone exceeds 15% by weight of the total weight of the reaction mixture in the reaction zone.

SUMM The various monomers, namely **vinyl acetate**, **ethylene**, and, optionally, one or more other  $\alpha$ -olefinically unsaturated monomers **copolymerizable** with **vinyl acetate** and **ethylene** (especially monoolefinically unsaturated monomers), are conveniently pumped into the reactor at a constant rate and in the desired proportions. The emulsifier and/or protective colloid, in aqueous solution, is also conveniently pumped in at a constant rate. Advantageously, the monomers, water, emulsifier and/or protective colloid, and, optionally, other polymerization auxiliaries are mixed prior to being pumped into the reactor; this can conveniently be carried out in a special mixer. One catalyst component, preferably the reducing agent, may also be mixed in at this stage. The other catalyst component, preferably the oxidizing agent, may then separately be pumped into the reactor at a rate depending on the rate of polymerization. If several reactors are being



used in series, the catalyst system may be partially introduced into successive reactors.

SUMM The proportion of ethylene in the copolymer is advantageously from 4 to 60%, preferably from 10 to 40%, by weight relative to the total weight of the **copolymer**. The proportion of **vinyl acetate** is advantageously from 50 to 96%, preferably from 60 to 90%, by weight relative to the total weight of the copolymer. Other  $\alpha$ -olefinically unsaturated monomers may also be used, advantageously in amounts of up to 40%, preferably up to 20%, by weight of the vinyl acetate proportion of the monomer mixture.

SUMM Examples of  $\alpha$ -olefinically unsaturated monomers **copolymerizable** with **vinyl acetate** and **ethylene** are **vinyl esters** of straight or branched carboxylic acids, preferably vinyl alkanoates, which esters advantageously have from 3 to 20, preferably from 8 to 14, carbon atoms, for example, vinyl formate, vinyl propionate, vinyl 2-ethylhexanoate, vinyl isononanoate, vinyl laurate, and the vinyl ester of Versatic acid; vinyl halides and vinylidene halides, for example, vinyl fluoride, vinyl chloride, vinylidene fluoride, and vinylidene chloride; esters of  $\alpha$ ,  $\beta$ -unsaturated monocarboxylic acids such as alkenoic acids having 3 to 6 carbon atoms with aliphatic alcohols such as alkanols having from 1 to 18, preferably 1 to 8, carbon atoms, for example the methyl, ethyl, propyl, butyl, and 2-ethylhexyl esters of acrylic, methacrylic and crotonic acids; mono or diesters of  $\alpha$ ,  $\beta$ -unsaturated dicarboxylic acids, such as alkenedioic acids having 4 to 8 carbon atoms, for example, maleic acid, fumaric acid, and itaconic acid with the above alcohols; olefins having from 3 to 10 carbon atoms, for example, propylene, butylene, and pentene; styrene; acrylonitrile; and mixtures of two or more of the said monomers. These monomers are oil-soluble monomers.

SUMM **Ethylene, vinyl acetate**, optionally other comonomers, an aqueous solution of the emulsifier, and an aqueous solution of the reducing agent were pumped from respective storage tanks, in a constant ratio, into a mixer, which was a 1-liter stirrer autoclave which could be cooled. The preliminary emulsion flowed out of the mixer into a first polymerization reactor, which was a 16-liter autoclave equipped with a stirrer and a heating/cooling jacket. The solution of the oxidation components was pumped in a separate stream from a storage tank into this reactor. In the same rate as the components were pumped into the first reactor, the dispersion entered a second reactor, which was a tubular reactor having a diameter of 2.5 cm and a capacity of 5 liters. This reactor terminated in a pneumatically controlled outlet valve, by means of which the pressure in the reactor system could be controlled. The dispersion passed through this valve, in an amount equivalent to the amount of starting components being pumped into the first reactor, into a pressure expansion container. Catalysts could be added subsequently in metered quantities into the second reactor.

CLM What is claimed is:  
1. The process for the continuous manufacture of an aqueous **ethylene/vinyl acetate copolymer** dispersion, which comprises continuously adding a monomer mixture of **ethylene** and **vinyl acetate** containing up to 40% by weight of the share of the vinyl acetate of an  $\alpha$ -olefinically unsaturated monomer **copolymerizable** with **ethylene** and **vinyl acetate**, in an aqueous emulsion containing emulsifiers and/or protective colloids, to a confined reaction zone, together with the continuous adding of a free-radical-forming water-soluble redox catalyst system comprising a reducing agent and an oxidizing agent and from 0 to 50 ppm, based on the

total monomers, of a heavy metal in the form of a heavy metal salt, maintaining said confined reaction zone at a temperature sufficient to effect polymerization and continuously withdrawing an aqueous

**ethylene/vinyl acetate copolymer**

dispersion from said confined reaction zone, the improvement which consists of (a) continuously adding said reducing agent and said oxidizing agent in a molar ratio of at least 3:1 and (b) continuously adding said monomer mixture at such a rate that the concentration of unreacted monomers at no place in said confined reaction zone exceeds 15% by weight of the total weight of the reaction mixture in the reaction zone.

5. The process of claim 1 wherein said aqueous **ethylene/vinyl acetate copolymer** dispersion being continuously withdrawn from said confined reaction zone has a solids content of from 40% to 65% by weight.

=> d 13 7 hit

L3 ANSWER 7 OF 28 USPATFULL on STN

DETD In addition to the above-described comonomers, the ethylene copolymer of the present invention can further contain other monomers for modification in a proportion up to 10 mol%. The modification comonomers which can be used include those known to be copolymerizable with **ethylene**, such as **vinyl esters**, e.g., vinyl acetate, vinyl propionate, etc., acrylic esters, e.g., ethyl acrylate, methyl acrylate, butyl acrylate, etc.; methacrylic esters, e.g., methyl methacrylate, ethyl methacrylate, butyl methacrylate, etc.; and ethylenically  $\alpha,\beta$ -unsaturated acids, e.g., acrylic acid, methacrylic acid, etc.

DETD The thus produced ethylene copolymer of the present invention is separated from the unreacted monomers in a separator according to the usual procedure for high-pressure radical polymerization. The **recovered ethylene** copolymer may be used as it is as a final product or, if desired, may be subjected to various post-treatments commonly applied to the products as obtained by the usual high pressure radical polymerization.

DETD In addition to the above-discussed high pressure radical polymerization, the ethylene copolymer according to the present invention can also be produced by a process, in which the monomer of the formula (I) or (II) is grafted to a commercially available high-pressure polyethylene or low-pressure polyethylene, such as low-density polyethylene, medium-density polyethylene, high-density polyethylene, an **ethylene-vinyl acetate copolymer**, an **ethylene**-acrylic acid copolymer, an ethylene-methacrylic acid copolymer, an ethylene-methyl acrylate copolymer, an ethylene-methyl methacrylate copolymer, an ethylene-ethyl acrylate copolymer, etc. The graft reaction can be carried out by a known graft polymerization process. For example, the above-enumerated commercially available polyethylene and the monomer of the formula (I) or (II) are mixed in such a proportion as to result in a desired copolymer composition, and the above-described organic peroxide is added thereto. The mixture is mixed in a super mixer, etc., and then heat-kneaded in a single-screw extruder, a twin-screw extruder, a Banbury mixer, etc. In this process, conditions usually employed in graft modification of polyethylene, etc. can be applied.

DETD Belonging to thermoplastic resins, the above-described ethylene copolymer may be blended with other thermoplastic resins, e.g., polyethylene, polypropylene, an **ethylene-vinyl acetate copolymer**, etc., as is usual for this kind of resin materials. Moreover, it may contain compounding additives, such as petroleum resin, waxes, stabilizers, antistatic agents, antioxidants,

voltage stabilizers, carbon black, ultraviolet absorbents, synthetic or natural rubbers, lubricants, inorganic fillers, etc.

=> d 13 5 hit

L3 ANSWER 5 OF 28 USPATFULL on STN

SUMM It is often convenient to remove aldehydes or vinyl esters from process streams. This is desirable because aldehydes or vinyl esters such as vinyl acetate are reactive materials and may interfere with subsequent utilization of the stream. For example, in the preparation of **vinyl acetate/ethylene copolymers**, a stream of waste gases is produced which contains **ethylene vinyl acetate**, carbon dioxide and other impurities. The gas is not suitable for recycling for further production of copolymer. However, instead of burning the gas as a waste gas, it is desirable to remove the vinyl acetate as well as carbon dioxide from the gas stream and **recover** the **ethylene** which may then be used for the production of polyethylene.

DETD During subsequent experimental tests in a large scale scrubber, with recirculating caustic-sulfite liquor removing **vinyl acetate** from **ethylene**, it was found that severe foaming of the scrubber was encountered at low mole ratios of sulfite to vinyl acetate, but could be prevented by maintaining the mole ratio of sulfite to aldehyde at 0.5 ( $\pm 0.1$ ). See Examples 4 and 5. In a large scale scrubber, the mole ratio of aldehyde or vinyl acetate to sulfite is a bit more difficult to describe. The gas stream proceeds through the scrubber, and is exposed to the aqueous caustic sulfite solution. From the pressure and flow rate of the gas, and the flow rate of the caustic sulfite solution through the scrubber, it is possible to calculate the amount of gas, and the amount of caustic sulfite solution which move through the scrubber in a given unit of time. The mole ratio of aldehyde or vinyl acetate to sulfite may then be calculated by comparing the number of moles of vinyl acetate and aldehyde in the volume of the gas process stream which goes through the scrubber in a given unit of time, compared to the amount of sulfite in the caustic sulfite solution which moves through the scrubber in the same unit of time.

DETD The invention can be practiced in any caustic scrubber suitable for scrubbing a gaseous process stream with an aqueous solution of a basic material. Such scrubbers are well-known to those skilled in the art. As an example, when the invention is being used for scrubbing a gas stream such as **ethylene**-containing **vinyl acetate**, a tubular scrubber containing polypropylene saddles has been found to be adequate. The gas stream is introduced at the bottom, and the sodium sulfite caustic solution is introduced at the top of the scrubber. However, the invention is not limited to a particular type of scrubber but will work with any type that provides for adequate contact between the scrubbing solution and the gas.

DETD Process scale testing of the effectiveness of the invention in a continuous process was done in a larger caustic scrubber. The process stream which was treated contained approximately 0.8 wt % **vinyl acetate** mixed with **ethylene**, carbon dioxide and other gases.

CLM What is claimed is:

6. A process according to claim 5 wherein the process stream comprises a mixture of **ethylene** and **vinyl acetate**.

9. A process according to claim 8 wherein the process stream comprises a mixture of **ethylene** and **vinyl acetate**.

12. A method according to claim 11 wherein said process stream is waste gases from the preparation of **vinyl acetate/ethylene copolymers**.

=> d 13 3 hit

L3 ANSWER 3 OF 28 USPATFULL on STN

SUMM Various multilayer films have also been considered (e.g. those taught in U.S. Pat. No. 5,112,674 and in EPO 0 243 965, EPO 0 333 508, and EPO 0 404 969), and significant among these are films made by co-extrusion of polyethylene with an ethylene/ $\alpha,\beta$ -ethylenically unsaturated carbonyl copolymer, such as **ethylene vinyl acetate** (EVA) or **ethylene acrylic acid** (EAA). While these films demonstrate an elastic recovery similar to PVC film, EVA and EAA are relatively expensive copolymers. Moreover, ethylene/ $\alpha,\beta$ -ethylenically unsaturated carbonyl copolymers are relatively difficult to fabricate, have a tendency to impart an offensive taste and/or odor to the food product, and are known to interfere with anti-fogging agents.

DETD In those embodiments in which the skin layer comprises a substantially linear ethylene polymer, the other layers of the multilayer structure typically include, but are not limited to, barrier layers and/or structural layers. These layers can be constructed from various materials, including substantially linear ethylene polymers, and some layers can be constructed of the same materials, e.g. some films can have the structure A/B/C/B/A. Representative, nonlimiting examples of the non-substantially linear ethylene materials are: metal foil, nylon, ethylene/vinyl alcohol (EVOH) copolymers, polyvinylidene chloride (PVDC), polyethylene terephthalate (PET), oriented polypropylene (OPP), **ethylene/vinyl acetate** (EVA) **copolymers**, **ethylene/acrylic acid** (EAA) copolymers, ethylene/methacrylic acid (EMAA) copolymers, LLDPE, HDPE, LDPE, nylon, graft adhesive polymers (e.g. maleic anhydride grafted polyethylene), paper and paperboard. Generally, the multilayer film structures comprise from 2 to about 7 layers.

DETD

TABLE 4

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PHYSICAL PROPERTIES OF VARIOUS MULTILAYER FILMS

			substantially
			substantially
Film	LLDPE/	linear ethylene/	linear ethylene/
Physical LLDPE/			
			substantially
Property EAA/	LDPE/	EAA	LLDPE/
	linear ethylene/		
			substantially
			substantially
			LDPE/
(unit)	LLDPE/		
	LLDPE	linear ethylene	
		linear <b>ethylene</b>	
		LLDPE	

---

Recovery (%)

	86.4/1.6
	86.6/0.46
	82.9/1.66
	87.0/0.99
	79.1/0.72
Puncture	21.7/1.67
	23.6/2.35
	20.1/0.85
	24.9/1.9

19.8/1.6  
 Force/In (N)  
 Puncture 24.5/1.48  
     23.8/4.5  
         19.8/1.1  
             24.7/4 21.1/0.7  
 Force/Out (N)  
 Elmendor MD (G)  
     130.6/2.64  
         191.2/6.4  
             75/7.4  
                 168/33.2  
                     69.4/7.4  
 Elmendor CD (G)  
     61.2/7.2  
         298/6.4  
             57.6/6.6  
                 45.8/6.7  
                     52/4.2

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=> log y

COST IN U.S. DOLLARS

SINCE FILE

TOTAL

ENTRY

SESSION

FULL ESTIMATED COST

120.76

120.97

DISCOUNT AMOUNTS (FOR QUALIFYING ACCOUNTS)

SINCE FILE

TOTAL

ENTRY

SESSION

CA SUBSCRIBER PRICE

-8.32

-8.32

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